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ELI-ALPS: the future stronghold of attoscience

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The "Attosecond Light Pulse Source" (ALPS), located in Szeged, is one of the three pillars of the "Extreme Light Infrastructure" (ELI), a major pan-european research infrastructure entering in the implementation phase. The specialty of ELI-ALPS is the generation of few-cycle and attosecond pulses at a repetition rate and/or energy orders of magnitude beyond the state of the art, also in combination with synchronized particle (electrons and ions) beams and terahertz radiation. ELI-ALPS will offer a unique mixing of various photon sources for multi-colour pump-probe experiments: spanning the spectrum from the THz to the x-ray range. The planned laser systems will also provide a record breaking photon flux in attosecond pulses, as well as the shortest wavelengths and pulse durations for attoscience applications. The attosecond and particle beamlines will serve as a user facility. User applications of attosecond x-ray pulses scan a wide range including time-resolved fundamental and structural studies. The beamlines will provide tools for probing electron dynamics in atoms, molecules, and solids with ultrahigh temporal resolution, for plasma diagnostics and for molecule imaging in time-resolved microscopic studies. ELI-ALPS together with the other two ELI pillars will offer to the international scientific community a unique integrated and distributed laser infrastructure with unprecedented performance and user attraction from a number of research areas.

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